

Scalable ParaView for Extreme Scale Visualization, Phase I

Completed Technology Project (2011 - 2011)



Project Introduction

Petscale computing is leading to significant breakthroughs in a number of fields and is revolutionizing the way science is conducted. Data is not knowledge, however, and the challenge has been how to analyze and gain insight from the massive quantities of data that are generated. In order to address the peta-scale visualization challenges, we propose to develop a scientific visualization software that would enable real-time visualization capability of extremely large data sets. We plan to accomplish this by extending the ParaView visualization architecture to extreme scales. ParaView is an open source software installed on all HPC sites including NASA's Pleiades and has a large user base in diverse areas of science and engineering. Our proposed solution will significantly enhance the scientific return from NASA HPC investments by providing the next generation of open source data analysis and visualization tools for very large datasets. To test our solution on real world data with complex pipeline, we have partnered with SciberQuest, who have recently performed the largest kinetic simulations of magnetosphere using 25 K cores on Pleiades and 100 K cores on Kraken. Given that IO is the main bottleneck for scientific visualization at large scales, we propose to work closely with Pleiades's systems team and provide efficient prepackaged general purpose I/O component for ParaView for structured and unstructured data across a spectrum of scales and access patterns with focus on Lustre file system used by Pleiades.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Kitware, Inc.	Lead Organization	Industry	Clifton Park, New York
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	New York

Project Transitions

 **February 2011:** Project Start

 **September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138480>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Kitware, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Utkarsha D Ayachit

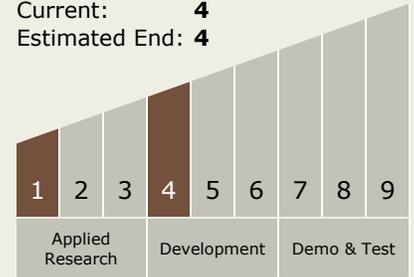
Co-Investigator:

Utkarsh Ayachit



Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
 - └ TX11.5 Mission Architecture, Systems Analysis and Concept Development
 - └ TX11.5.2 Tools and Methodologies for Performing Systems Analysis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System